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Published Monthly by the AMERICAN JOURNAL OF OPTOMETRY PUBLISHING ASSOCIATION,
1501 Foshay Tower, 821 Marquette Ave., Minneapolis, Minn.

ANNUAL SUBSCRIPTION $4.00 CANADA $4.50, FOREIGN $5.00
Single copies, 50c

Entered as second-class matter February 20, 1924, at the postoffice at Minneapolis, Minnesota, under the Act of March 3, 1879.

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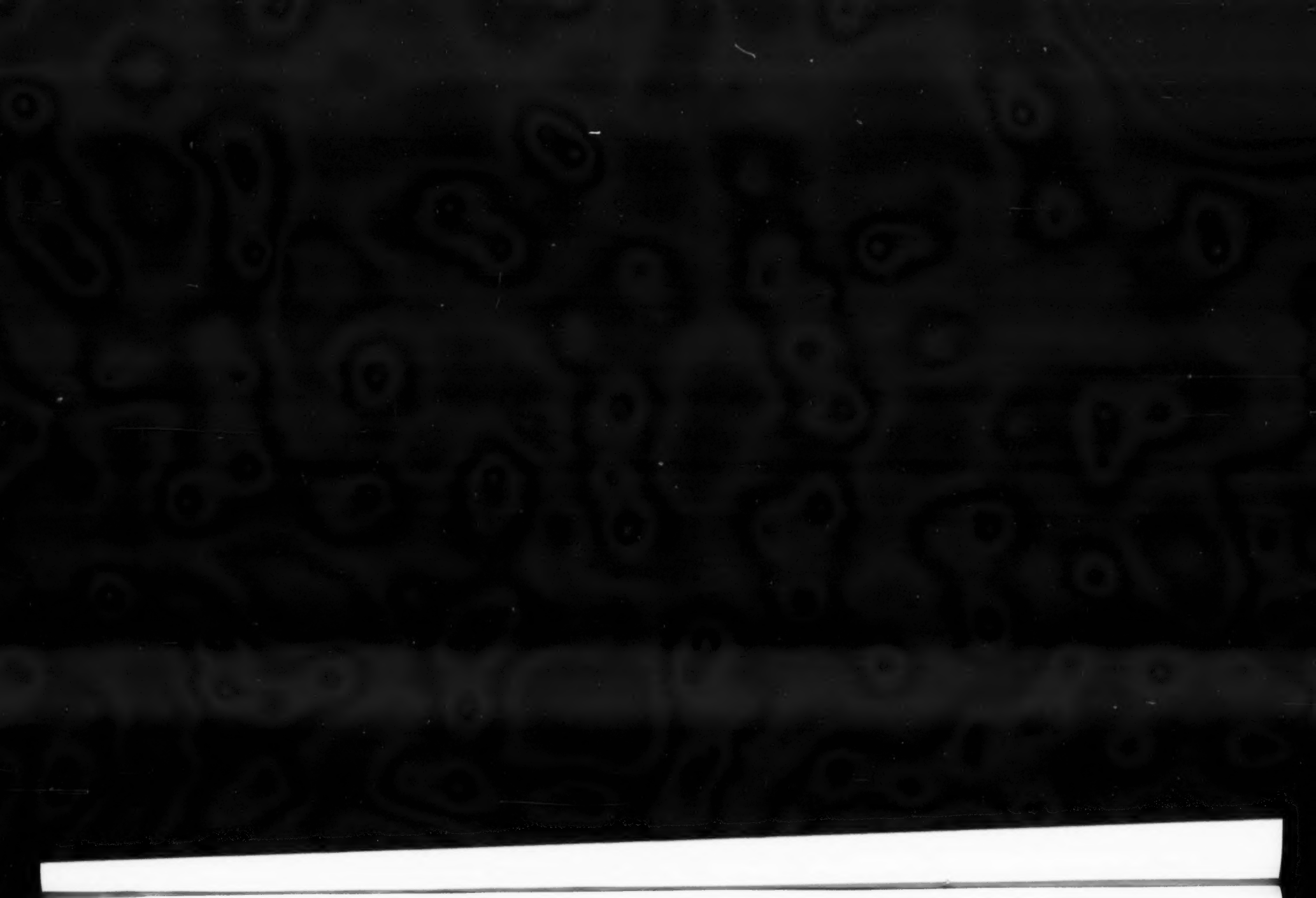

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The AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF THE AMERICAN ACADEMY OF OPTOMETRY serves as the official publication of the American Academy of Optometry. It is published monthly by the American Journal of Optometry Publishing Association under the editorial supervision of the American Academy of Optometry.

Publication Office: 1501-1504 Foshay Tower. 821 Marquette Ave., Minneapolis, Minn.

AMERICAN JOURNAL OF OPTOMETRY *and* ARCHIVES *of* AMERICAN ACADEMY OF OPTOMETRY

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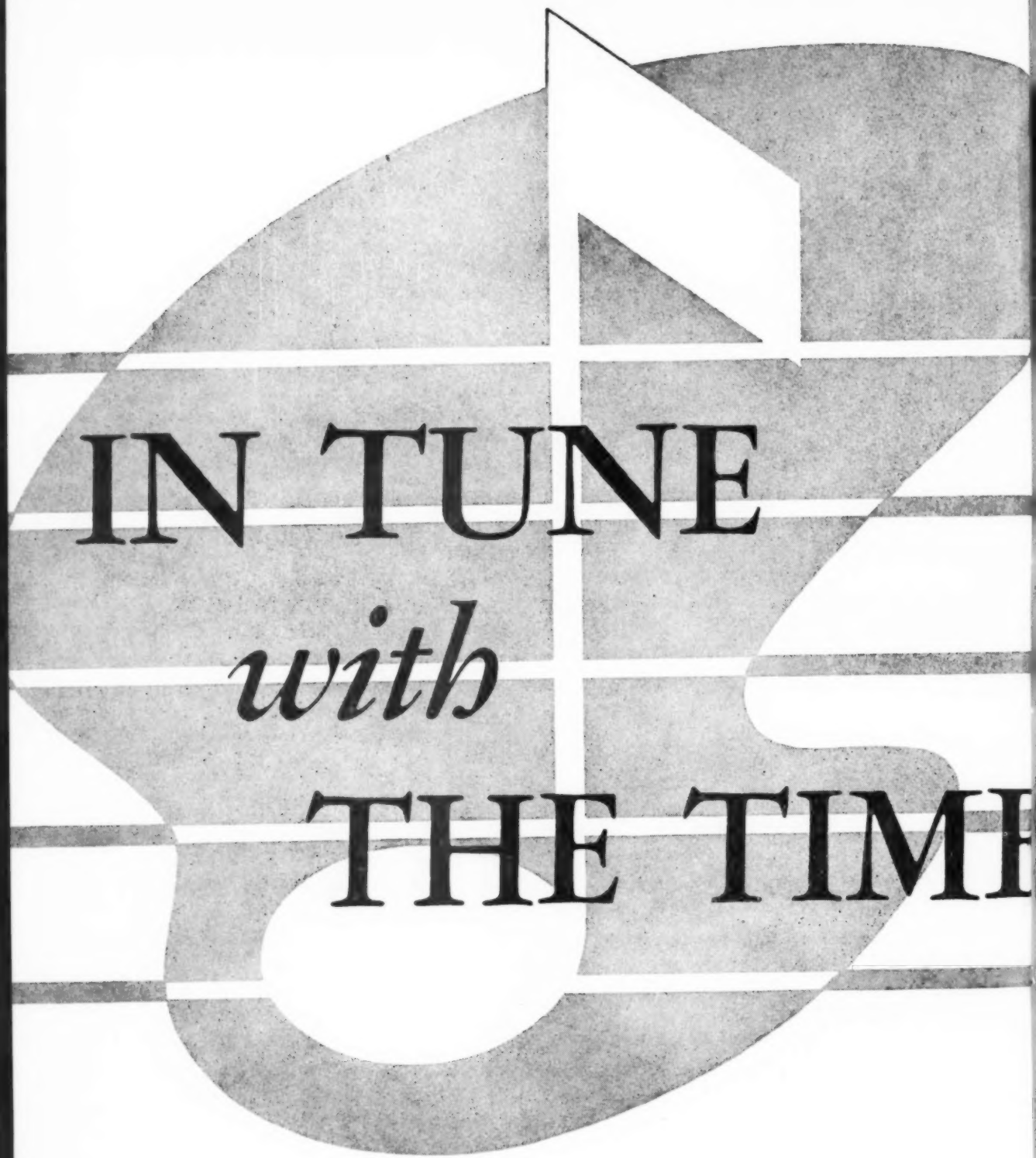
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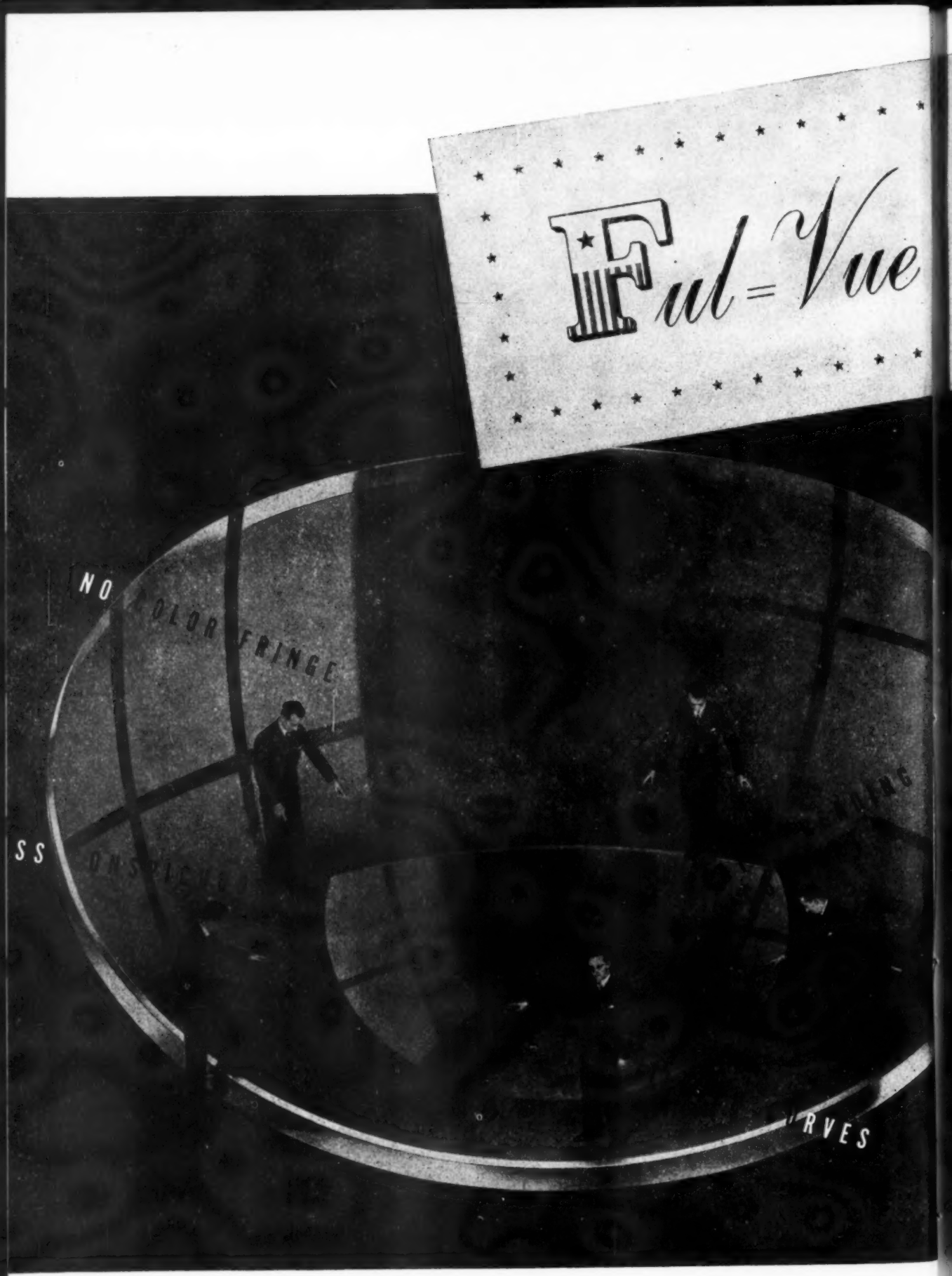
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Vol. 18 MARCH, 1941 No. 3

NORMS OF REFRACTION. A PARTIAL HISTORICAL SURVEY OF REPORTED DATA*

Norman J. Drew, Opt.D
New York, N. Y.

Since the beginning of the 19th century, one of the phases of ophthalmic science, has been the examination and comparison of the refraction of large groups of people. The results of these eye surveys have been crystallized into averages, or a series of norms, since norms lend themselves to wide use. A "norm" may be defined as: a model; a typical structural unit; a rule or authoritative standard. It is our concern now to review the prevailing standards as they were developed in eye surveys (or from case records). In this review we will find that few of them are as yet accepted as authoritative, that many are contradictory, and that some are based on untenable premises or hypotheses. In addition, a few rules for the collating of data in this field will become apparent.

Norms are important in optometric theory since they point to a solution of questions such as: the refraction of the typical human eye; the prevalence of the ametropias in different nations, at different age-levels, and their etiology; the value of wearing of lenses which correct ametropia from early life and which affects the tendency toward change in refraction; the early correction of ametropia and its effect upon visual efficiency in later years; the relation of school-work, occupation, economic status, ancestry and parentage on refraction; and other problems of this type. Norms are important from an administrative standpoint, for, with the development of Public Health Optometry, it will be necessary to know the distribution of the various types of eye defects before allowances for eye-care services are allotted. Despite the importance of these and similar questions, data have been collected for but a few of them.

*Submitted on November 12, 1940 for publication in the March, 1941 issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

Some surveys, such as that performed by the United States Public Health Service[6] workers on Washington, D. C., school children, cover at one stroke persons of different age-levels, and then are used to supply data which is interpreted as applying to people advancing through the age-groups included. If care is used in choosing the original sample so that factors of varying selection may not apply, the errors which might creep into the results because of this assumption are of minor degree, if indeed they are present at all.

The foundations of the science of physiological optics were laid several centuries ago. Since then, competent statistical studies of the variation in visual acuity at different ages have appeared.[1,2] But satisfactory norms for the spherical refraction of the human eye at different age-levels are not yet established. The reasons for this gap in our knowledge appear to be that the raw data on which calculations are to be made are not easily available, and that those who have the data at hand have not interested themselves in this aspect of the science. The difficulty in obtaining data lies in the fact that, ideally, the norms should be based on refractions made on a single group of a large number of people, otherwise unpicked as far as visual anomalies are concerned. These people are assumed to be of nearly the same ages, and are refracted with standardized techniques at various intervals throughout their lives. In this way the prevalence and changes of the ametropias in a normal group may be obtained for all age-levels. But investigations of this type must await the fruition of optometry's efforts in public health. Data which approach this ideal are available in the records of eye surveys in public schools, industrial concerns, fairs, and motor vehicle and aviation bureaus. Unfortunately, few of these sources have been the bases of studies of the norms of refraction.

Statistical methods define the ideal procedure outlined above.[3] It is important to understand, however, that statistics need not be derived from studies of the entire population. These can be properly developed from representative samples providing these samples are properly chosen. Care must be taken not to use groups of persons who visit clinics or private practitioners as the result of ocular symptoms, as these persons constitute a selected group which is not a representative sample of unselected population.

The point is consciously labored because the results of most of the studies below are vitiated by the fact that they are based on inadequate or biased samples. The data are based on series of cases which, for the

most part, have been obtained in office and clinic practice. The results, then, pertain to an abnormal selected group only, and we are seeking norms for all human eyes, not merely for the visually defective or anomalous. According to an authoritative study,[4] this factor of selection was considered to be of sufficient importance to alter the numerical results of correlations by 25 per cent. To obtain a sample of the population from case records of eye clinics allows play to unwanted sources of variance in other ways. When we come to the study of the development of refraction, it will be seen that this practice may alter the true trend of change as tabulated. Thus, if a child with low hyperopia has an extensive reduction of his defect he becomes myopic and continues to come for re-examination. If a highly hyperopic child has an extensive reduction of his defect he may discard glasses and not return at all.

In most of the studies made by ophthalmologists, a cycloplegic was used for a majority of the cases covered, but not for all. It is therefore clear that the technique of refraction in these studies was not uniform throughout; and as has been pointed out by others,[5] homatropine, which was the cycloplegic used in most of these cases also presents results which at times may not be constant. As yet our knowledge does not permit the correlation of refractive data when the findings are taken both with and without the cycloplegic.

DATA REPORTED BY TASSMAN

In Table I is presented a summary by Tassman[7] of the refractions made in the eye department of a large hospital. It should be remembered therefore that the results are based upon a selected group. The examinations were made with cycloplegics on almost all patients under 40, and on a few above that age. It should be noted that some of the classes in the table cover a shorter period of years than others, and that, since no statement of the severity of the defects is presented, the table should not be taken too literally. Further, the factor of selection probably works in an erratic fashion. In all probability, the children under 5 years were brought to the hospital chiefly because they suffered from strabismus. We may therefore expect an unusually high proportion of hyperopes in this group. In addition, the factor of selection would seem to apply still more to the lower than to the higher age levels, since the hospital would deal with children with only an uncommon degree of ametropia. The column marked "0.50 D. or Less" contains many cases of mixed astigmatism, and the other columns the related astigmatisms.

TABLE I

PREVALENCE OF SPHERICAL AMETROPIA AT DIFFERENT AGES. PHILADELPHIA, PA. 1931.

Age Group	Cases (a)	0.50 D. or Less (b)		Hyperopic		Myopic	
		Number Eyes	Per Cent	Number Eyes	Per Cent	Number Eyes	Per Cent
Under 5 yrs.	406	10	1.2	794	97.8	8	1.0
5 - 10	855	74	4.3	1488	87.1	148	8.6
10 - 15	1031	210	10.1	1449	70.4	403	19.5
15 - 20	853	206	12.1	1079	63.2	421	24.7
20 - 30	1378	414	15.0	1736	63.0	606	22.0
30 - 40	1404	373	13.4	1996	71.0	439	15.6
40 - 50	1538	549	17.9	2081	67.7	446	14.4
50 - 60	988	336	17.1	1317	66.6	323	16.3
60 - 70	552	130	11.8	775	70.2	199	18.0
Over 70 yrs.	165	30	9.1	231	70.0	69	20.9
Total	9170	2332		12946		3062	

(a) Based on hospital records of patients who have, for the most part, been refracted with a cycloplegic.

(b) From the method of classification this column contains many cases of mixed astigmatism, and those who with the indicated error did not require glasses.

TABLE II

REFRACTION CURVES FITTED TO DATA FROM VARIOUS COUNTRIES. 1934.

Observer:	*Wibaut*	*Sorsby*	*Bd.O.Ed.Eng.*	*Wibaut*	*Scheerer*	*Brown*
Material (age)	New-born	4-8 yr.	4-15 yr.	Adolesc.	Adult	Adult
Number	2398	672	2624	2920	12,000	4431
Type of Curve (a)	I	IV	IV	IV	IV	IV
Mean (D)	+2.6	+2.26	+2.28	—0.3	+ 0.3	+0.7
Mode (D)	+1.25	+2.31	+2.63	+0.2	+0.21	+0.61
Standard Deviation (D)	1.47	1.23	1.75	1.64	1.13	1.97
Skewness	—0.92	+0.04	+0.3	+0.3	—0.08	—0.05
Modal Ordinate	30.2%	40.0%	28.2%	32.1%	43.8%	27.0%
Refraction (abcissae)			Percentages (ordinates)			
+6.D etc.	4.6	0.9	2.2	—	—	1.0
+5.D	7.2	2.3	4.7	—	0.3	2.0
+4.D	12.8	9.5	13.7	0.2	0.7	4.7
+3.D	15.7	26.7	26.2	1.0	3.4	6.7
+2.D	27.5	33.5	26.0	6.4	14.1	17.0
+1.D	29.8	19.0	15.1	23.3	28.3	19.0
0.	1.9	5.7	6.8	31.7	33.0	25.8
—1.D	0.3	1.6	2.9	20.3	8.4	11.9
—2.D	0.2	0.4	1.2	9.5	1.5	8.0
—3.D	—	0.3	0.6	4.1	0.2	2.1
—4.D	—	0.1	0.3	1.8	0.1	1.3
—5.D etc.	—	—	0.3	1.7	—	0.5
	100.	100.	100.	100.	100.	100.

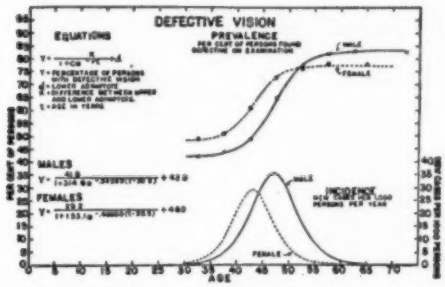
(a) These numbers refer to the comprehensive system of frequency curves associated with the name of Karl Pearson, who has derived equations and has described in detail a number of the standard types. These are not normal curves. Type I is a skew, bell-shaped curve of limited range. In this case it rises gradually to the mode on the hyperopia (+) side and drops abruptly on the myopia (—) side. Type IV is a skew curve of unlimited range at both ends, roughly described in general appearance as a slightly deformed normal curve.

Of the total number of eyes about 70.6% were hyperopic, and 16.7% myopic, with 12.7% in the third classification. It would be expected that any forces of nature or environment which affect the refraction would work in a smooth, regular manner. If this is so, the irregularities present in the per cent columns are due to the choice of class interval, or to the effect of selectivity on the data. Certainly, the sample is large enough to allow for a smoothly graduated column.

ADDITIONAL DATA

In Table II is presented a more thorough statistical study of the norms of refraction. Dunstan,[8] in an effort to disprove the idea that errors of refraction are distributed in accordance with the requirements of the normal curve of probability (Gaussian curve), fitted statistical curves to the data of several observers including English, German and American investigators. In order to facilitate comparison, the number of cases in each series was reduced to 100, thus allowing the successive ordinates in each curve to be given as percentages. Note that the means fall into two groups presumably due to the development of myopia at puberty in many cases; that the mean of +2.6 D. in the new-born indicates the prevalence of hyperopia at that age; and that there are few myopes whose defects are of congenital origin. The fact that the standard deviation increases with the age-level shows increasing variance from, or less cluster of cases about the mean.

An excellent example of the use of statistical curves in describing the incidence and prevalence of visual defects has been afforded by the application of a logistic curve to data collected on an unselected group. The logistic curve, sometimes termed the Pearl-Reed growth curve because of the extensive use these men made of it in population studies, represents a modified geometric progression, the growth of a series that tends to decrease as it approaches some specified limit. It was found that the curve would fit very closely the observed values resulting from the Snellen and Jaeger distance and near visual acuity tests made as part of a general physical examination. The subjects were 100,924 white male, and 11,694 white female ordinary life insurance policyholders. They were examined by the Life Extension Institute. Defective vision was defined as anything less than the standard acuity in either eye. The logistic curve was applied only to the age-groups above 30 years, when the development of presbyopia is the reason for the large increase in "defective" acuity. In Figure I, the upper set of curves, are the logistic curves applied to the prevalence of presbyopia. The incidence curves



Source Figure 1. "Frequency of Eye Refractions in 9,000 Families." S. D. Collins, Public Health Reports, 49:22:649-666; June 1, 1934, page 654.
Data based on the results of Snellen and Jaeger tests performed on 100,924 male and 11,694 female ordinary life-insurance policyholders.

are derived from the upper set, and are obtained from the differences between the computed prevalence at successive ages.

That vast fields for research exist in the development of ocular norms is emphasized by the hypothesis that presbyopia is related to the life expectancy of the individual. The conception that a definite relationship exists between the aging of the crystalline lens and of the body in general has been propounded. Most of the means of determining changes in the elasticity of the blood vessels and of various other tissues of the body are clinical methods seldom permitting exact measurements. The refraction of the eye, however, may be determined with relative exactness. If therefore the concept that presbyopia is related to the aging of the body or the life expectancy is definitely accepted, the norms of presbyopia and the science of refraction will assume new importance.[9,10,11]

DATA REPORTED BY JACKSON

In the data which has been presented to the professions there can be found support for each of the theories on this development outlined above. In Table III figures are presented from the practice of Dr. E. Jackson,[18] a prominent ophthalmologist. The averages presented are probably arithmetic means. The fact that these are case records, and that cycloplegia was used in many of the cases introduce the effect of uncontrolled variables into the data. Thus an unselected group would give a higher percentage of myopes among the young. It is unfortunate that no measures of variability from the central figures were given.

DATA REPORTED BY U. S. PUBLIC HEALTH SERVICE

Further evidence is found in the data gathered by workers of the U. S. Public Health Service in the survey made in Washington, D. C.,

schools.[6] The figures indicate that the modal, or most frequently found eye in the 6-8 year group had from 0.75 D. to 1.0 D. of hyperopia. In the 12-16 year group the modal eye had about 0.50 D. of hyperopia.

Table III

MEAN SPHERICAL AMETROPIA AT VARIOUS AGES
(United States—1931)

Hyperopia

Age	Eyes (a)	Average Ametropia (b)	Number with 7 D. or over
Under 5	48	3.07D	2
5-10	393	1.95	13
10-15	605	1.51	8
15-20	777	1.20	8
20-30	1987	1.27	19
30-40	2298	1.29	10
40-50	2568	1.45	20
50-60	1492	1.53	9
Over 60	1117	1.80	9
	11285		98

Myopia

Age	Eyes (a)	Average Ametropia (b)	Number with 10 D. or over
Under 5	0	—	
5-10	37	3.34D	6
10-15	133	2.79	6
15-20	314	2.88	11
20-30	580	2.27	13
30-40	560	2.93	24
40-50	492	2.92	29
50-60	384	3.23	28
Over 60	296	3.57	28
	2796		145

(a) Based on the refraction of office patients (for the most part with a cycloplegic).
(b) The average ametropia figures are presumably arithmetic means.

Studies of this nature are best illustrated by the use of comprehensive graphs. In this manner it is evident that the spherical ametropias and emmetropia must be considered not as separate anatomical or anomalous states, but as variants from a common mean, and as different states in an unbroken series. One of the clearest sets of graphs on refraction curves to appear in the literature was included in the Washington study. It describes the data given above, and shows the tendency for a shift in the ametropias toward the emmetropic or myopic side of the scale with increase in age of the children. The irregularities in the curves may well be due to the varying effects of cycloplegics on the

TABE IV

SPHERICAL REFRACTION IN SCHOOL CHILDREN. WASHINGTON, D. C. 1924(a).

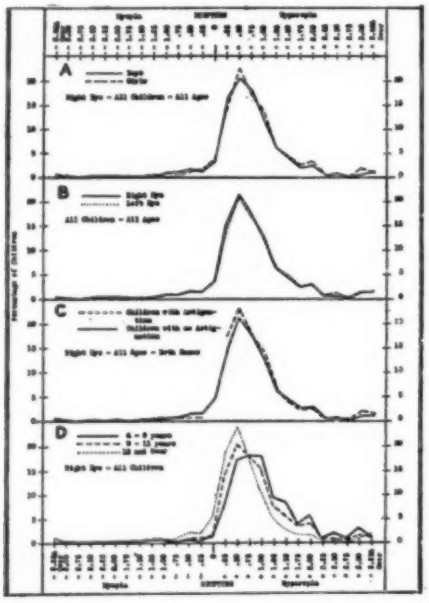
	Diopters	All ages			6-8 years			9-11 years			12 years and over		
		Both sexes	Boys	Girls	Both sexes	Boys	Girls	Both sexes	Boys	Girls	Both sexes	Boys	Girls
						— Percentage of children —							
Hyperopia (b)	+3.25 and over	1.7	1.8	1.6	1.4	1.9	0.8	1.7	1.6	1.9	1.8	1.9	1.7
	+3.00	1.4	.7	2.0	2.7	1.9	3.4	1.1	1.0	1.2	1.0	.3	1.9
	+2.75	.4	.5	.3	.9	.7	1.1	.4	.8	...	.3	.3	.2
	+2.50	1.1	1.1	1.1	2.1	1.9	2.2	1.4	1.0	1.9	.6	.8	.3
	+2.25	.8	.7	1.0	1.2	.3	2.0	1.2	.6	1.9	.5	.8	.2
	+2.00	3.0	2.7	3.3	6.9	5.5	8.1	3.3	3.0	3.7	1.5	1.7	1.3
	+1.75	2.7	2.3	3.0	3.8	2.3	5.0	3.4	3.8	3.1	1.9	1.7	2.1
	+1.50	4.8	5.0	4.7	8.4	9.7	7.3	5.6	4.4	6.8	3.3	3.9	2.7
	+1.25	6.5	6.5	6.6	8.7	9.1	8.4	8.0	8.1	7.8	5.1	5.0	5.2
	+1.00	13.4	12.8	14.0	18.3	18.5	18.2	15.4	15.3	15.4	10.7	9.9	11.7
	+0.75	17.4	17.7	17.0	18.2	16.9	19.3	17.7	18.1	17.3	17.0	17.8	16.1
	+0.50	21.5	21.6	21.4	16.2	18.5	14.2	21.0	21.2	20.8	23.5	22.7	24.5
	+0.25	14.8	15.4	14.1	7.7	9.4	6.1	13.0	13.5	12.6	18.0	18.1	17.9
	0	3.6	3.5	3.7	1.5	.7	2.2	1.3	1.4	1.2	5.4	5.4	5.5
	—0.25	1.5	1.5	1.5	.2	.7	...	1.3	1.4	1.2	2.0	1.9	2.2
	—0.50	1.7	1.8	1.5	.8	1.3	.3	.8	1.2	.4	2.4	2.3	2.6
	—0.75	.8	1.0	.7	...	...	...	.9	1.8	...	1.0	.8	1.3
	—1.00	.7	1.0	.4	.2	.7	...	1.0	1.4	.6	.6	.9	.3
Myopia (b)	—1.25	.5	.4	.6	...	...	...	.5	.4	.6	.6	.5	.7
	—1.50	.3	.3	.4	.5	...	.8	.4	.2	.6	.2	.4	...
	—1.75	.2	.2	.3	.2	...	.3	.1	...	.2	.3	.3	.3
	—2.00	.3	.3	.2	...	...	...	.4	...	.8	.3	.6	...
	—2.25	.1	.3	...	...	...	...	...	...	...	.3	.5	...
	—2.50	.2	.3	.06	...	...	...	...	...	...	.4	.6	.1
	—2.75	...	...	...	...	...	...	...	...	...	...	...	...
	—3.00	.2	.05	.3	.2	...	.3	...	...	...	.3	1.0	.4
	—3.25 and over	.5	.6	.4	...	...	...	...	...	...	.9	.09	.7
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: "Refractive Errors in the Eyes of Children." 1928. Public Health Bulletin No. 182. Washington, D. C., p. 48.

(a) Based on the refraction of each eye of 3,658 white school children as determined by the retinoscopic examination with the use of a cycloplegic.

(b) The astigmatisms are included with the corresponding ametropias, and are recorded by the power of the sphere; simple astigmatism is recorded according to the powers of the abnormal axes. Cases of mixed astigmatism are not included.

individuals concerned. The study did not deal with the same children at different ages, but with different groups of children from the same population. Since the only factor of selection at work in the older children not present in the younger would be the elimination from the group of some very high myopes, and since the inclusion of the latter would but increase the apparent tendency of the shift as found, it is felt that this method is applicable; i.e., the older children are not less representative of the general population than the younger. (See Figure II.)



Source Figure 2. "Refractive Errors in the Eyes of Children . . . " Public Health Bulletin No. 182, Washington, D. C., page 24.

Data based on the refraction in each eye of 3,658 white school children as determined by the retinoscopic examination with the use of a cycloplegic. Washington, D. C.

DATA REPORTED BY BOTHMAN

While the Washington survey analysts concluded that the "hyperopic eye tends to improve with advancing school age . . . the myopic eye tends to grow worse with advancing school age," various other contemporary investigators have found trends in refraction data of a different order. In 1932, Bothman[14] examined 124 children from 10 months to 5½ years of age, with different results. The average age of the group was 3.96 years at the beginning and 5.61 years at the end of the study. The subjects were patients from clinics and private practices.

There were 85 cases of convergent squint, 6 of divergent squint, and 31 whose chief complaint was poor vision. In 60% of the cases several refractions were done, under atropine, from 6 to 12 months apart. This, then, was a highly selected pre-school group. The author concluded: "It is true that this series is a small one from which to draw undisputed conclusions, but since 178 or 71% of the 248 eyes showed an increase in both meridians in the second determination of the refractive error under atropine, it would seem that in this type of hyperopic eye in patients wearing the full correction, there may be an increase in the hyperopia up to 6 years of age, and not a decrease as is commonly believed to be the case."

DATA REPORTED BY VORISEK

This conclusion was sustained by a study of the change in refraction of the eyes of children with convergent strabismus. The children were under 13 years of age, and were examined at least twice under atropine. Vorisek,[15] the author, concludes: "One is forced to admit as far as these figures are concerned, that there is an increase in the average hyperopia in both the converging and fixating eye in cases of children with convergent strabismus under 13 years of age."[15] He had found an increase in 55% of the children with no change in an additional 8%, out of a total of 101 children.

DATA REPORTED BY BROWN

A study in Chicago,[16] at a clinic with chiefly strabismic children as subjects again showed that out of 604 eyes re-examined under atropine after at least one year from the first examination, 63% had shown an increase in hyperopia, and 8% no change.

As a result of further studies of this kind, Brown[17] concluded: (1) Hyperopia increases each year until the end of the seventh year contrary to the generally accepted view. (2) Myopia increases and hyperopia decreases rapidly from 8 to 13 years, as generally held. (3) From 14 to 20 years this increase continues each year but at a rate barely half that of the previous period.

DATA REPORTED BY CIOCCO

Other studies by Ciocco,[18] apparently on a more certain basis than those referred to above, indicate that not much change takes place in the average child's eye over a period of a few years. Thus the first statistical study of the results of repeated retinoscopic examination of 1,481 white school children of Washington, D. C., re-examined after an aver-

age interval of almost 2½ years reveals that: (1) The frequency of simple hyperopia was reduced by almost 20% while that of astigmatism (hyperopic and myopic) increased by about 40%, and of simple myopia by about 70%. (2) Over 75% of the eyes with any of the main types of refractive errors remained unchanged during the stated interval. (3) The chances of a change in type of refractive error appeared to decrease with increase in the age of the children.

DATA REPORTED BY SOURASKY

As a result of the study of the changes in refraction in the eyes of children coming to a school clinic in England, where cycloplegia was used, Sourasky[19] concludes: the vast majority of hyperopic cases are stationary, or almost so during the school period. About 66% of those with hyperopic errors of 1.25 D. or less were stationary cases. A certain proportion of all hyperopes showed some reduction of the defect, say up to 1.50 D. A much smaller proportion showed a marked reduction, even over 4 D. On the other hand, progression is characteristic of about 66% of the myopes. Some of the myopes are of the stationary type, many progress slowly and constantly, some few progressing rapidly.

In view of the following, mainly, that some cases of hyperopia change as rapidly as myopia, that some cases of myopia remain as stationary as hyperopia, and that cases of symmetrical eyes may progress unequally, he argued that the refractive condition of an eye has little to do with progression. This tendency he regarded as an abnormal state supervening as readily in the hyperopic as in the myopic eye, and which might affect one eye only of a pair. That this tendency should be seen most often in myopia is only to be expected, as it induces a myopia where this had not existed before. Myopia is then the result and not the cause of progression. Finally, during the school period the growth of the eye, he claims, has but little effect on its refractive condition.

DATA REPORTED BY BLEGVAD

Blegvad[12] distinguishes three types of progression. The first is linear, or almost linear over the whole period of observation. The second type gives a rather steep curve in a first period, with a diminishing slope to the curve with increase in age of the individual. In the third type the rate of progression is alternately slow and rapid. From his study of individual cases he concluded that the average progression diminishes with the increasing age of the patient; that it is greater in the higher degrees of myopia; and that the degree of correction worn does not seem to influence the development of the myopia.

DATA REPORTED BY HALBERTSMA AND VERRIJP

Halbertsma and Verrijp[12] studied the development of the refraction in a similar group, i.e., selected clinic or private patients. They found that in most cases the refraction developed toward increased myopia. The refraction of a second group was stable, while in a third and smaller category were those whose hyperopia increased.

A further lead worth following in this field is of the interrelations and developments of the various elements of ocular refraction. Thus, emmetropia may result from a happy combination of several variant factors which are, if we exclude those anomalies of the "indicial" type: the corneal radius, the shape and position of the crystalline lens; and the axial length of the eye.

Over 30 years ago, Steiger concluded that the variations of corneal curvature followed the normal curve of distribution. Some aspects of the data he collected have been statistically reduced by Barrington and Pearson.[4] The fact that the standard deviation decreases from the value found for the first age-group in Table V indicates that there is a greater cluster of cases about the mean in the older groups. The correlation of corneal refraction and age is rather low.

TABLE V

AGE, SEX, AND CORNEAL REFRACTION (1909)

MALES

Age	to 8 years	10-16 years	16-88 years
Number of Eyes	248	882	232
Mean.	42.88	42.71	42.42
Standard Deviation	1.324	1.289	1.289

FEMALES

Age	to 8 years	10-16 years	16-88 years
Number of Eyes	252	1034	363
Mean.	43.59	43.14	42.99
Standard Deviation	1.451	1,204	1.360

FOR BOTH GROUPS

General Mean. (Males) 42.75. (Females) 43.17.
General Standard Deviation (Males) 1.291. (Females) 1.293.
Correlation of refraction and age. (Males) r=.174. (Females) r=.155.

Tron in Russia found that the ocular power of the lens similarly varied normally. He therefore concluded that the only other factor, the axial length, was an asymmetrical variant, since as we have seen, the total refraction of the eye does not vary with the normal distribution, according to most authoritative studies. Tron showed that there was no standard axial length for the emmetropic eye. From his work he concluded that if the axial length of an adult eye was less than 20.4 mm., the eye was hyperopic. If the axial length was more than 25.5 mm., the eye was myopic. Between 21.6 and 23.9 mm. the eye might fall into either of these categories, or be emmetropic.[20, 8]

Progress from this point of view now awaits more fruitful employment of the instruments and statistical methods now in use, and the development of new tools in research. For example, modern techniques in measuring the human organs in life may present a new approach toward a solution of these problems. A method of estimating the length of the living eye has been developed in which an opaque substance is injected behind the eye, a roentgenogram is taken, and the length of the eye as a whole is measured. If greater refinement of this process can be brought about, a real contribution to the study can be made, since the other elements of refraction are of comparatively easy measurement.

DR. NORMAN J. DREW
305 CONVENT AVE.
NEW YORK, N. Y.

REFERENCES

1. Collins, S. D., and Britten, R. H. Variation in Eyesight at Different Ages, as Determined by the Snellen Test. Reprint 979 from the Public Health Reports, December, 1924; 6 pages.
2. Koch, C. C. Some Notes on Visual Surveys and the Relative Distribution of Cases with Subnormal Visual Acuity. American Journal of Optometry, 14:3:105-118, March, 1937.
3. Statistics and Public Health Optometry. Public Health Bureau, A. O. A. (with collaboration of N. Drew). Lecture, 1:10; 8 pages; August, 1940.
4. Barrington, A., and Pearson, K. A First Study of the Inheritance of Vision and of the Relative Influence of Heredity and Environment on Sight. 1909. Galton Eugenics Laboratory, London. University College.
5. Koch, C. C. An Investigation as to the Need for Drops or Cycloplegics in Eye Examinations. American Journal of Optometry, 15:1; page 29; January, 1938.
6. Kempf, G. A., Collins, S. D., Jarman, B. L. Refractive Errors in the Eyes of Children as Determined by Retinoscopic Examination with a Cycloplegic. Public Health Bulletin 182, Washington, D. C., 1928.
7. Tassman, I. S. Frequency of the Various Kinds of Refractive Errors. American Journal of Ophthalmology. 3:15:11:1044-1053; November, 1932.
8. Dunstan, W. R. Variation and Refraction. British Journal of Ophthalmology, 18:404-410; July, 1934.

9. Collins, S. D., and Pennell, E. H. The Use of the Logistic Curve to Represent the Prevalence of Defective Vision Among Persons of Specific Ages Above 30 Years. Human Biology, 7:2:257-266; May, 1935 .
10. Presbyopia and the Duration of Life. Editorial, Journal American Medical Association, 1239-1240; October 14, 1933.
11. O'Rourke, D. H., and Jackson, E. Changes of Refraction with Presbyopia. Trans., Amer. Ophthalmological Soc., 1930. 28:222-230.
12. Halbertsma, K. T. H., and Verrijp, C. D. On the Evolution of Individual Refractions. Internatl. Ophthalmological Cong., 1937. Communs. libres, 4:71-76; 1938.
13. Jackson, E., Norms of Refraction. Trans., Sect. Ophthalmology, A. M. A., 174-190, 1931.
14. Bothman, L. Refraction Changes in the Eyes of Children Under Six Years of Age. Arch. of Ophthalmology, 7:294-296; 1932.
15. Vorisek, E. A. Changes in Refraction in Children with Convergent Strabismus. American Journal of Ophthalmology, 3:18:9:820-826; September, 1935.
16. Brown, E. V. L. Apparent Increase of Hyperopia up to the Age of Nine Years. American Journal of Ophthalmology, 19:12:1106; December, 1936.
17. Brown, E. V. L. Net Average Yearly Changes in Refraction of Atropinized Eyes from Birth to Beyond Middle Life. Archives of Ophthalmology, 19:719-734; May, 1938.
18. Ciocco, A. Changes in the Types of Visual Refractive Errors of Children. Public Health Reports, 53:35:1571-1578; September 2, 1938; Washington, D. C.
19. Sourasky, A. The Growth of the Eye and the Development of Myopia; A Study of the Changes of Refraction During the School Period. British Journal Ophthalmology, 12:625-644; 1928.
20. Brown, E. V. L., and Kronfeld, P. C. The Refraction Curve in the U. S. A. with Special Reference to Changes in the First Two Decades. Compte-Rendu du XIII Concilium Ophthalmologicum Amsterdam, September, 1929.

NORMAL VALUES OF VISUAL FUNCTIONS AND THEIR APPLICATION IN CASE ANALYSIS. PRESENTING A TABLE OF NORMAL VALUES FOR VISUAL FUNCTIONS.*

Part V.†

Howard F. Haines, M.Sc., D.O.S.
Director, Optometric Eye Clinic, Ohio State University, Columbus, Ohio

In part IV of this paper an analysis of refractive findings was presented along with a determination of normals which may be used as guides in making a refractive analysis. In this portion of this report the writer will present a condensation of the material presented in part IV. Part VI will deal with case typing and corrective procedure.

TABLE OF NORMAL VALUES FOR VISUAL FUNCTIONS
(Condensed)

Corneal Curvatures (No. 2)[1]	+ .50 D × 180, or net correcting cylinder as indicated by curvatures measured, using the Javal or other standard method.
Static Retinoscopy (No. 4), 6 M.	Basic Refractive finding.
Subjective, 6 M (No. 7)	Using Static as base modify to subjective cylindrical acceptance, and maximum visual acuity with maximum inhibition to accommodation. Normal—Same as Static +0.50D. less plus. Tends toward full Static in older individuals with lower amplitude of accommo-

*Submitted for publication October 19, 1940.

†Parts I, II and III of this report appeared in the January issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY. Part IV appeared in the February issue. The concluding report, Part VI, will appear in the April issue.

[1] The numbers in parenthesis are the numbers assigned to the particular diagnostic or refractive technique by the Optometric Extension Program.

	dation, and toward full .50 D reduction in young healthy individuals with high amplitude. (V.A. from 20/10 to 20/30 depending on age, Rx, health, fatigue, familiarity with letters, attention, perception, training, retinal mosaic, and other factors.)
Lateral Phoria (No. 8), 6 M	Mean—Orthophoria. Normal Range—1 Eso. to 1 Exo, inclusive.
Vertical Phoria (No. 12), 6 M	Less than 1△ of vertical imbalance. Vertical ductions 2△ or more, approximately balanced.
Negative Convergence, 6 M (Base in to break) (No. 11)	Mean—9.24△. Normal—7△ or over.
Negative Reversion to Fusion, 6 M (No. 11) (Base in to recovery)	Mean—4.63△. Normal—⅓ of break or over, 3△ minimum.
Positive Relative Convergence, 6 M (No. 9) (Base out to blur)	Mean—8.71△. Normal—6△ or over, within the range ½ to double the Negative Convergence.
Positive Total Convergence, 6 M (No. 10) (Base out to break)	Mean—22.26△. Normal—16 or over.
Positive Reversion to Fusion, 6 M (No. 10) (Base out to recovery)	Mean—6.31△. Normal—⅛ of break or over, 3△ minimum.
Dynamic Retinoscopy, 40 cm. (No. 5)	Mean—+1.02 D added above Static 6 M. Normal—+.62 to +1.50 D added to Static. Approaches the lower limit with young healthy individuals having a high amplitude of accommodation, and the higher values in approaching presbyopia, lowered amplitude, or decreased ciliary tone due to any cause (including ill health, myopia, over-correction of hyperopia, etc.). Approaches +2.50 D in older

	presbyopes. To be used as gross indication of basic near point requirements and check on near point astigmatism, spherical balance, and differences in amplitude of accommodation between the two eyes.
Lateral Phoria, 40 cm. (No. 13B)	Mean—4.85 Exo. Normal—2 to 8 Exo, inclusive. (Slightly higher in presbyopia when taken through reading add.)
Fused Crossed Cylinder, 40 cm. (No. 14B)	Mean—+.44 D added above Subjective. Normal—+.25 D to +.87 D added to Subjective. For age 40 and over, Normal—+.50 to +1.00 added. (Note—This finding is optional. If taken it should be followed by a phoria through the add if +1.00 or over, otherwise, through +1.00 added to determine affect on convergence.)
Negative Relative Convergence, 40 cm. (No. 17A) (Base in to blur)	Mean—14.91△. Normal—11△ or over.
Negative Total Convergence, 40 cm. (No. 17B) (Base in to break)	Mean—22.44△. Normal—19△ or over.
Negative Revision to Fusion, 40 cm. (No. 17B) (Base in to recovery)	Normal—4/7 of break or over, 8△ minimum.
Positive Relative Convergence, 40 cm. (No. 16A) (Base out to blur)	Mean—16.30△. Normal—13 or over, *within* the range ½ to double the Neg. Rel. Conv. and at least approximately double the near point phoria. (Note—Repeat Neg. and Pos. Rel. Conv., No. 17A and 16A, through +1.00 added if Pos. approaches twice Neg. and through —1.00 added if Neg. approaches twice Pos.)
Positive Revision to Fusion, 40 cm. (No.	Normal—⅓ of break or over, 7△ minimum.

16B) (Base-out to recovery)	(Note—There is a negative correlation with the near point phoria. High Exos will tend toward the lower limit in Positive Reversion to Fusion, and Esos,or low Exos, will tend toward higher reversions, near ⅔ of break.)
Negative Relative Accommodation, 40 cm. (No. 21) (Binocular plus to blur)	Mean—From +1.69 to +1.74, all age groups. Normal—+1.75 to +2.25, inclusive, for all age groups. Presbyopes may manifest as high as +2.75 D or even +3.00 D depending on ciliary tone, acuity, and perception. (Note—Values higher than the above usually indicate under-correction of plus or over-correction of minus in the basic distance Rx. Lower than the above values usually indicate either a hypertonicity, over-correction of plus, or under-correction of minus at distance.)
Positive Relative Accommodation, 40 cm. (No. 20) (Binocular minus to blur)	Mean—From —2.25 to —1.64 depending on age. Normal— —1.50 to —2.75 inclusive for all ages between 15 and 40. Higher values than —2.75 are normal for young healthy individuals with high monocular amplitudes and in cases of convergence deficiency where a high percentage, or all of the monocular amplitude is available binocularly without interference from convergence. Values as low as —1.25 D are normal for individuals of 40 or over, or for uncorrected or under-corrected myopes where accommodation is usually lower than the normal age expectancy. With the exceptions noted above, the Positive Relative Accommodation should come *within* the range of ½ to double the Negative Relative Accommodation, and at

	least approximately double the fused cross cylinder.
Total Amplitude of Accommodation (No. 19)	Normal for age using Donder's table. Minimum 5.00 D push up, or 4.00 D by the minus lens method.
Fusion	Normal— Stereopsis (Keystone DB6 card) 70%. Fusion PR (Keystone DB4A to H series) 1 mm. dots. Fusion PP (Keystone DB5A to H series) 1 mm. dots.

DR. HOWARD F. HAINES
21 EAST STATE ST.
COLUMBUS, OHIO

AMERICAN JOURNAL OF OPTOMETRY
and ARCHIVES *of*
AMERICAN ACADEMY OF OPTOMETRY

Established 1924

Vol. 18 MARCH, 1941 No. 3

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Published Monthly by the
AMERICAN JOURNAL OF OPTOMETRY PUBLISHING ASSOCIATION

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A REVIEW OF A CASE OF POLYOPIA

The optometrist Holland[1] presents the case of a patient, female, age 83. She had a history of no serious ocular problems until about 10 years ago. At that time the patient suffered a concussion as the result of an accident and since has had what she termed "variable" vision. Her symptoms at the time of consulting Holland were: in viewing distant objects she saw them in triplicate, one above the other. As an example:

[1]N. C. Holland. Unusual Case. The Institute News (Wellington, New Zealand), p. 3. Issue of September, 1940.

a motor car appeared to be on the ground, on line with her eyes and a third car well elevated above the other two. Her distance visual acuity was also found to vary considerably. At the near-point without glasses she could read 12 point type with ease at the normal reading distance, and she claimed her near vision was improved when she read while lying on her back with a book held above and directly in front of her eyes. She complained of no multiple vision or diplopia at the near-point.

Holland found her average uncorrected distance visual acuity to be O.D. 6/24, O.S. 6/60. Her present reading correction which seemed to be of no value to her, proved to be O.D. +3.25 D.Sph. O.S. +4.00 D.Sph. The patient had not been using a distance correction. An ophthalmoscopic examination disclosed a clear bubble in each crystalline lens, as well as two small central radiating cataract opacities. The view of each fundus was none too good but in the left eye Holland suspected an old partial detached retina, the detachment being but small in size. The patient's intra-ocular pressure taken by palpation seemed normal.

A +1.00 D.Sph. improved the acuity of vision of the right eye to 6/15 and a +1.50 D.Sph. ⊃ +1.00 D.Cyl. axis 55 brought the visual acuity of the left eye to 6/15, but visual acuity dropped to the level of uncorrected vision when this distance correction was used binocularly, nor could binocular vision be improved with any other correction.

A near-point addition of O.U. +2.50 D.Sph., made reading impossible yet the patient read J.8 at 10 inches and J.4 at six inches without difficulty with no lenses before her eyes. A diagnosis of polyopia due to lenticular involvement was made and the patient was discharged without correction.

Here is a case of double monocular diplopia which in turn developed into a polyopia when the eyes were used binocularly. Whether a prismatic correction could have returned this case to one of only diplopia was not attempted by Holland, probably because of the patient's age. There is some question, too, as to just what improvement there would be between vertical multiple vision and vertical diplopia, either being, the writer presumes annoying. The surgical removal of the right crystalline lens, followed by proper aphakic correction for both distance and near vision for the right eye, coupled with the occlusion of the left eye would have removed the polyopia. This very radical treatment, how-

ever, was apparently not considered, as the patient mentioned in this report, despite her advanced age and her visual impairment, succeeded in getting about with surprising ease.

Carel C. Koch.

MYOPIA

In discussing progressive myopia, Pascal[1] points out that while the average anterior-posterior axial length of an eye is 24 mm. that variations in this length along with unusual conditions of growth of the crystalline lens may account for the development of myopia in some patients and progressive myopia in others. This view is supported by Tron who while approaching the subject from a different angle, developed data to show that an axial length which would produce emmetropia in a patient with a cornea within the normal range of corneal refraction, would produce either hyperopia or myopia in a second patient with a cornea of different refractive power, but still within what might be termed the normal corneal power range.

Tron presents the following figures taken from 275 subjects.[2] Sixty of these cases were emmetropic, 120 myopic and 95 were hyperopic. Of the emmetropic cases the refractive power of the eye varied from 52.59 D. to 64.21 D. of the myopic cases the refractive power varied from 53.84 D. to 66.88 D. while the refractive power of the hyperopes varied from 53.31 D. to 65.30 D. In these same cases the axial length of the emmetropic eyes varied between 22.42 mm. to 27.30 mm. The myopes from 22.19 mm. to 38.08 mm. and the hyperopes from 20.75 mm. to 25.62 mm.

While Tron has shown the total refractive power of the eye to vary from 52.29 D. to 66.88 D. it is known that the cornea itself has a normal refractive power which varies from 36 D. to 48 D. frequently accounting for much of the total refractive power variance from one eye to another in different patients. We thus see that we have normal variations in refractive power of the crystalline lens and the cornea as well as normal variations in axial length of the anterior-posterior diameter of the eye. With these three sets of normal variations, why is it not possible to assume that instead of myopia being a separate entity in the light

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[1]J. I. Pascal. Origins and Treatment of Progressive Myopia. American Journal of Optometry, Vol. 17, No. 8, pp. 351-366, 1940.

[2]Annotation. A Note on Myopia. The Optician (London, England), Vol. XCIX, No. 2575, p. 420, 1940.

of its being a serious ocular abnormality, that it is merely the reverse of the refractive condition known as hyperopia and that some persons are thus normally myopic just as are some patients normally hyperopic on the same hereditary chance that some are blondes and some brunettes or some are short and some tall? Obviously, the various possible combinations of these normal refractive power components could certainly account for many if not most cases of myopia.

—Carel C. Koch.

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

by J. Fred Andreae, Secretary

A department devoted to announcements, reports, appointments, organization data, news, professional problems and ideals, as these relate to the Academy.

AN INVITATION TO OPTOMETRISTS TO QUALIFY FOR FELLOWSHIP IN THE ACADEMY

On behalf of the Executive Council, as Secretary, I take this opportunity of inviting every eligible optometrist in America to affiliate with the American Academy of Optometry. We all sincerely believe such action will signally benefit both the individual practitioner in this field and our own important profession of optometry.

By now taking such individual action the eligible optometrist will associate himself with fellow professional practitioners, who have banded together to preserve the high professional ideals inherent in optometric work. Men who approach the problems of optometric practice from the same aspect as does the eligible applicant and men who will welcome him into this professional society.

The Academy is a democratic organization. Fellowship is open to all optometrists who practice professionally and ethically. The requirements of practice are the normal, common sense professional requirements and the method of enrollment is simple.

In this magazine this month, on a nearby page (143-144), will be found an Academy Application Blank. If you practice professionally, and we believe you should, this blank is for your use. Fill it out today,

and mail it with a check for $5 to the Secretary, American Academy of Optometry, 901-903 Lexington Building, Baltimore, Md.

If you have been in practice since 1926 also enclose ten case records from your files, each chart accompanied by a brief review of your final diagnosis and disposition of the case.

The annual dues are $15 which will include your subscription fee to the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY as the Academy pays this for each of its members.

If you have entered the practice of optometry between 1926 and 1936, in addition to sending in a few case reports, you will be requested to attend an annual or regional meeting at which time you will submit to either a practical or written optometric examination, depending upon the number of years you have been in practice. The details of these regulations are given on the reverse of the application blank.

The writer sincerely believes that every eligible optometrist should make a most determined effort to affiliate with the Academy. Fellowship in this society brings professional prestige and associations which can only come through the contacts made in an ethical body of technical practitioners.

Again may I refer you to the enclosed Application Blank, and invite you now to take the first step towards a lifetime association of which you will always be proud.

REPORT OF THE COMMITTEE ON READING DISABILITY PROBLEMS IN THE SCHOOLS*

Your Committee on Reading Disability Problems in the Schools submits the following report: Our contacts with grade and high schools, colleges and schools of graduate education from coast-to-coast during the past few years, indicates that a fairly large percentage of educators are vitally interested in visual problems as related to scholarship and, especially as related to reading. Both as chairman of your committee, and as Director of the American Research Council of Optometry, I have experienced hearty reception and cooperation from all educational institutions contacted and especially from the graduate schools of education.

*An abridgment of the material presented before the American Academy of Optometry, December 8, 1940.

It is too early to state exact percentages of the enrollment in the schools and colleges whose visual handicaps are such as to prevent them from reading efficiently. From the present knowledge obtained by the American Research Council of Optometry, it would seem to indicate that approximately 30 per cent of freshmen college students, who failed to respond to pedagogical training, would profit greatly in reading ability from suitable optometric training. From the same source, it would appear safe to estimate that approximately 40 per cent of the grade and high school students could materially improve their reading ability through suitable optometric assistance. Undoubtedly, this percentage would vary greatly in different sections of the country.

Educators, as a whole, seem eager for any knowledge in relation to reading since they realize that reading is an essential prerequisite to obtaining knowledge in any form.

George A. Parkins, Chairman.

PROCEDURE AND INSTRUMENTATION

by Guy L. DuPlessis

A department wherein discussions will be carried on relative to the value of various experimental and clinical techniques as employed by practicing optometrists, and also in which the instruments used by optometrists in various phases of their work, will be subjected to some critical evaluation.

PRINTING TYPE AND READABILITY

The readability of type has been a subject of perennial interest to psychologists, printers, optometrists and others. The printing art to date has more frequently been influenced by printing traditions than by technical considerations of readability. Drs. Donald G. Patterson and Miles A. Tinker of the University of Minnesota, Department of Psychology, have devoted twelve years to research on this subject. This research culminated in a book published in 1940 by Harper Brothers of New York entitled *How To Make Type Readable*. The result of this research is the negation of many current traditions of the printing industry such as the size of margins, the length of lines and leading.

Sixty-six thousand tests given to thirty-three thousand persons and including the preferences of the individuals tested indicate the following:

1. Type sizes smaller than 8 point and larger than 12 point are undesirable. Reader preference favors 11 point type.

2. Line width is not an important factor in legibility, but reader preference favors moderate line widths.

3. Leading is of no advantage, and in large type is a disadvantage.

4. Margins do not promote legibility, in any way, and seem to be waste of paper.

5. In speed of reading tests, Garamond type placed first, Scotch second and Antique third, but reader preference was Cheltenham first, Antique second and Bodoni third.

The personal preferences are said to be sufficient to offset the slight differences in speed of reading. The authors sum up their recommendations with the statement that, "The heavy hand of traditions continues to dominate printing practice." All tests mentioned were performed by means of eye movement photography.

These studies by Patterson and Tinker presumably involve only the normal eye. The ametropes and presbyopes, as they comprise a large portion of the reading public, are entitled to some consideration and most likely their preference would be for bold and contrasting type faces. If printing standards were gauged to the needs of the emmetrope further savings in space and paper would be effected by using small type and leading closer to the minimum visible. However, such is not the case and within reasonable limits printing must be geared to the needs of the ametrope and presbyope. Hence, while the conclusions of Patterson and Tinker as to margin might be acceptable, their conclusions as to size of type and leading are subject to scrutiny, unless these findings are based on the study of subjects who, within reasonable limits, fall within the general grouping of subnormal vision.

There must be a point beyond which greater leading and larger type size do not improve the vision of old age, and yet retard the reading speed of youth. To my knowledge no such studies have been made and while work of Patterson and Tinker shows an approach in that direction, the writer is inclined to agree with DIRECT ADVERTISING MAGAZINE* that the preference of the aged should continue to be considered.

*Vol. 26, No. 3, January, 1941.

LAMINATED BITORIC BIFOCAL LENSES

Single vision iseikonic lenses, used to correct aniseikonia, usually require toric surfaces on both sides. Fused bifocal lenses, on the other hand, must have a spherical surface, usually on the front. For this reason, iseikonic bifocal lenses were heretofore constructed as so-called doublet lenses, the front lens having a toric front surface and the rear lens, which carried the bifocal segment, having a spherical front surface and usually a toric rear surface.

These two lens elements were separated by an air space, and were cemented together at their round edges. The greatest cosmetic disadvantage of this construction consisted of the fact that the lenses appeared thick and heavy, and had to be mounted in round metal frames. In addition, reflections at the inner surfaces of the doublets were sometimes found to be highly annoying. With the perfection of the *American Optical Company* lamination processes, it became possible to eliminate the air space between the two lens elements so that the iseikonic bifocal lenses have now all of the advantages of ordinary single lenses.

To make these new iseikonic bifocal lenses, two lenses are used. The one nearer to the eye is a bifocal lens and the other a single vision lens. These are ground in pairs, to complementary curves, on adjacent inner surfaces. Between these lenses is placed a layer of lamina which under pressure becomes affixed to the lenses and also transparent. The new lenses present a decided cosmetic improvement over the old. They are found to be thinner and it is possible to vary the lens shape thus enabling the patient a wider choice of spectacle frames.

BOOK NOTICES AND REVIEWS

Books received are acknowledged by notices in this department. Special selections will be made for more extensive review in the interest of our readers as space permits.

Morse-Peckham, Ray. Optometric Methods of Correcting Strabismus in Children, Six Months Old and Upward, Without Using Special Exercises. Published by the Optometric Research Institute, Detroit, Michigan. 1940. Pp. 102. Board covers. $1.00.

The author devotes several pages to a discussion of his methods of prism therapy. In this experiment 374 children were employed.

One hundred eighty-one children were given prisms. This book is a report upon the results of this part of the experiment. One hundred ninety-three children were given the conventional orthoptic exercises and of these only 43% were dismissed as cured. On the other hand 68.5% of the 181 prism cases were discharged as cured. When we add to these the number showing satisfactory progress at the time of the writing of the report, the total of satisfactory cases is exactly 90%. From an analysis of these clinical results we find prism therapy is twice as effective as the conventional orthoptic methods.

Peckham outlines the specific tests employed and makes a tentative summary of the therapeutic principles which he uses. However the major portion of the book consists of fifty selected case reports. These are classified according to the type of squint i. e. right or left convergent squint, binocular convergent squint, alternating divergent squint, right or left divergent squint and binocular squint with nystagmus.

This work is distinguished by the boldness by which the experimenter manipulates the therapeutic agents in an empirical approach to the problem of squint. It seems that we have in this work of Peckham an original and new philosophy of therapy which is distinctly optometric in its origin. The writer ventures an opinion that by 1950 the work of Peckham in prism therapy will be regarded by optometry as one of its marked contributions to society.

—C. W. MORRIS.

ABSTRACTS

A department in which will appear abstracts of the literature of optometry, ophthalmology and applied optics. These will be classified according to the following list, although contributions to all sections will not necessarily appear in each issue.

1. Ocular Refraction.
2. Physiological Optics and Color Vision.
3. Ocular Muscles.
4. Orthoptics and Reading.
5. Anatomy, Histology and Embryology.
6. Ocular and General Pathology.
7. Ophthalmic Lenses and Material.
8. Instruments.
9. Hygiene and Illumination.
10. Applied and Physical Optics.
11. Education, Sociology and Economics.
12. Miscellaneous.

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1. OCULAR REFRACTION

JACKSON CROSSED CYLINDER: A CRITIQUE. Friedman, B. Archives of Ophthalmology, 1940, 24, 490-499.

Following an examination of the uses of the crossed cylinder, the

author concludes that (1) in building up the optimum sphero-cylindrical combination, the use of individual cylinders from the trial case is on the whole more advantageous than the use of the crossed cylinder, (2) in determining cylinder strength the criterion of improved visual acuity seems more reliable than the comparative blurs involved in the crossed cylinder test (if the eye is unfogged, the Jackson crossed cylinder excites the accommodation), (3) the crossed cylinder technic (as described by Jaques) for determining the presbyopic correction does not reveal too encouraging results, indicating in many cases too high a spherical addition, (4) the greatest value of the crossed cylinder lies in the determination of the astigmatic axis. Friedman offers a simplified test for axis based on the optical principles of the crossed cylinder.—R. J. B.

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4. ORTHOPTICS

CLINICAL USE OF LACQUER IN OPHTHALMOLOGY FOR THE TREATMENT OF SQUINT, SUPPRESSION, AMBLYOPIA AND DIPLOPIA. Good, P. Archives of Ophthalmology, 1940, 24, 479-481.

Lacquer may be applied to an ophthalmic lens for the purpose of reducing acuity when partial occlusion is desired. The degree of reduction (practically, from 20/40 to 2/100) may be varied simply by the amount of brushing or stippling the lacquer receives as it dries. The advantages of occlusion are then gained without loss of peripheral fields and without objectionable cosmetic effects.—R. J. B.

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6. OCULAR AND GENERAL PATHOLOGY

TENSION TOLERANCE. Gradle, H. S. Journal of the American Medical Association, 1940, 115, 7, 495-496.

Gradle discusses one phase of the glaucoma problem, this being the critical point in intra-ocular tension. He points out that normal intra-ocular tension may be defined as that degree of tension which the tissues of the eye are able to withstand without damage to function. Conversely, he therefore concludes that before pronouncing an intra-ocular tension pathologic it is necessary to determine whether that degree of tension is producing damage to the functions of the eye. He points out the well known fact that progressive loss of function due to hypertension will

manifest itself first by abnormalities in the central visual field, next by contractions of the peripheral visual field and last by a decrease in central visual acuity.—C. C. K.

AN INTERESTING CASE—Faith I. The Optician (London), 1940, XCIX, 2570, 338.

Faith reports the following case. Patient, male; occupation, constable. Complaint, failing vision. No pathological condition could be detected and glasses effected no improvement in vision. Case referred to a Glasgow ophthalmic surgeon and to internists for general medical examination. All reports were negative. Case referred to dentist for oral examination. Dentist reported abscess of left lateral incisor. Abscess and tooth were removed and patient's vision returned to normal almost immediately.—C. C. K.

CENTRAL SCOTOMAS: THEIR IMPORTANCE IN TOPICAL DIAGNOSIS. Walsh, F. B., and Ford, F. R. Archives of Ophthalmology, 1940, 24, 500-534.

This study is based on clinical cases illustrating the occurrence of central defects in visual fields occasioned by lesions at various levels in the optic pathways. Consideration is not given to macular lesions which are readily visible on ophthalmoscopic examination. Attention is given first to certain anatomical arrangements accountable for definite characteristics of central defects. Clinical considerations, including an outline of the more common etiological factors, are discussed in connection with the case reports submitted. A discussion of the paper by Dr. John Evans is appended.—R. J. B.

SINUS INFECTION AND OCULAR DISORDERS. Furman, M. A. The Columbia Optometrist, 1940, XIV, 53, 2-3.

Furman discusses focal infections and points out that because of the close proximity of the nasal sinuses to the orbit, sinus infection should be frequently sought as the cause of ocular disorders. He groups these involvements that arise from infection of the sinuses under the headings (1) those affecting the eyeball and its adjacent structures, (2) those affecting the optic nerve, and (3) those affecting the cellular structures behind the eye itself. Furman claims that a mild sinus infection treated

conservatively has often relieved a serious orbital condition. He presents the following four cases to illustrate this point.

Patient, Miss R. Age 20. Complains of severe headaches and ocular strain at end of working day. Referred with report of myopia and exophoria. Five weeks of daily prism exercises had failed to relieve the exophoria. A chronic non-suppurative sinusitis was found. Sinuses were treated conservatively, and exophoria was relieved fully and permanently within three weeks.

Patient, Mr. H. P. Age 45, was subject to attacks of mild iridocyclitis of the left eye coming at irregular intervals for the past two years. His sinuses revealed a chronic purulent left ethmoid and antrum. Irrigations of the antrum and suction douches aborted an attack in two days. Sinuses were then treated for two months. The patient has had no ocular involvement for the past three years.

Patient, Miss B. Age 25. Patient suffering from an acute iritis of the left eye accompanied with excruciating pain. Wasserman negative. Patient had an acute attack of pan-sinusitis with mucopus coming from both sides of the nose. No previous history of iritis. A hot saline suction douche of the nose relieved the eye pain at once. This therapy was used every three hours for three days in addition to local treatments to the eye of atropine and hot applications. The eye cleared completely in ten days.

Patient, Mr. D. Age 43, was suffering from an exudative choroiditis of the right eye. Vision 20/100. Left eye normal. A mass of choroidal exudate was seen in the right eye with scars of previous attacks. Wasserman negative. Physical examination negative. Blood pressure within normal limits. A mild secondary anemia was found to be present. Hemoglobin 85. No focus of infection was found in teeth, tonsils or intestines. The sinuses showed chronic thickening of mucous linings and excessive mucoid discharge. Treatment consisted in nasal suction douches after removal of slight nasal obstructions to ventilation and drainage of the sinuses. Also the use of stock and autogenous vaccines and iron and liver extracts for the anemia. The choroidal exudate disappeared gradually and the vision returned to 20/20. Furman was able to keep in touch with this patient and during an eight year period there have been no further attacks.—C. C. K.

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9. HYGIENE AND ILLUMINATION

A VISOR FOR THE PREVENTION OF WAR INJURIES OF THE EYE. Cruise, Sir R. Journal of the American Medical Association, 1940, 114, 24, 2397.

At the annual congress of the Ophthalmological Society (England), Sir Richard Cruise demonstrated a visor which he invented for attachment to the steel helmet worn by soldiers. By a single movement it can be brought down over the upper part of the face and similarly can be retracted within the helmet. The mesh is so fine that exceedingly small missiles are prevented from entering the eye, while at the same time vision is only slightly limited. Cruise has found that fragmentation from explosives is the primary cause of war blindness and feels that the use of a visor of this type would to a large degree prevent this. The society passed a resolution urging authorities to adopt the device.—C. C. K.

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11. EDUCATION, SOCIOLOGY AND ECONOMICS

CAUSES FOR REJECTION FOR ENTRANCE INTO THE REGULAR ARMY DUE TO PHYSICAL DEFECTS. Leone, G. E. Journal of the American Medical Association, 1940, 115, 15, 1283-1284.

Leone reports on the causes for rejection due to physical defects of applicants for enlistment into the Regular Army of the United States. The report covered a three month period, June, July and August, 1940, of applicants examined physically in the southern New York District of the Second Corps Area, which includes New York City proper.

The total number of applicants covered in this report was 6,743. All of these were young men between the ages of 18 and 35. Of this total, 2,195 were rejected for failure to meet physical requirements. The major causes for failure in the order of their importance numerically were (1) teeth, (2) eyes, (3) height and weight, (4) feet, and (5) ears.

Leone reports that 479 applicants were rejected because of ocular problems. This is 21 per cent of the total rejected. He finds that most of this group were rejected because of a failure to have their refractive problems corrected, a large number of them suffering from myopic astigmia.

—C. C. K.

REPORT OF THE COMMITTE ON VISUAL ECONOMICS. Special Article. Journal of the American Medical Association, 1940, 115, 5, 368-369.

The report consists of two tables. The first presents the basic factors used in various States for computing industrial visual disability, and the second, the percentage schedules of loss of visual acuity as compared with Snellen, now in use among the different States. The report is presented by Albert C. Snell of the Section on Ophthalmology of the A. M. A.—C. C. K.

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12. MISCELLANEOUS

THIRD ANNUAL SUMMARY OF FOURTH OF JULY INJURIES. Journal of the American Medical Association, 1940, 114, 1, 39-41.

This report of the A. M. A. claims that in 1939 there were 5,560 injuries in the United States due to fireworks and explosives used as the result of the annual country-wide July 4 celebration. Statistics are given as to the locality in which the injuries occurred as well as the type of injury. Comment is also made on State legislation relative to reducing this accident toll. Of the total number of injuries reported, most are burns and lacerations. 19 cases are reported in which loss of vision of one or both eyes resulted, and 158 cases are reported in which an eye was injured.—C. C. K.

CORRESPONDENCE

COMMENTS ON HEAT TREATED PROTECTION SPECTACLES

To the Editor: The article, "A Criticism of Heat Treated Protection Spectacles," by G. L. DuPlessis in the October, 1940, issue, pages 476-480, of the AMERICAN JOURNAL OF OPTOMETRY, was both timely and worth while in view of the growing importance of industrial eye protection at this time when national defense orders necessitate a considerable expansion of industrial operations.

There are, however, certain technical inaccuracies which in our opinion bear reviewing to eliminate possible misunderstandings on the

part of optometrists or industrial managers responsible for the safety and well being of workers in industry.

In the fifth paragraph describing goggles for use against flying particles, it is stated, "Protective glass is a special hardened, flat glass of adequate and uniform thickness." The protective glass used is as frequently of the curved type, ground and polished to optical standards, which when properly heat treated, provides on the average, safety lenses of greater impact resistance than flat lenses of comparable thickness.

Your article continues with mention of the practice of grinding ophthalmic corrections into safety lenses of minimum 5 mm. thickness and of the questionable safety value of this practice. Safety lenses, either with or without correction ground in are, to the best of our knowledge, never manufactured to a minimum thickness of 5 mm. and are usually within the range of 3 to 4 mm. With regard to the question of impact resistance attainable by heat treating ophthalmic grade glass, it is to be emphasized, as anyone familiar with the process will verify, that ophthalmic grade glass responds to proper heat treatment as readily and as effectively as any type of glass commonly used for protection lenses.

Three questionable optical considerations are advanced in regard to correction ground safety lenses. The first states, "There is a strong possibility that as the prescription of these lenses is obtained by neutralization an error may be made in determining the power of lenses required." Neutralization is, we believe, no longer practiced and is to be condemned for both ordinary ophthalmic lenses and protection lenses. The second questions the proper positioning of glasses, especially in the case of bifocal corrections. If the examiner responsible for the correction and fitting prescribes correctly, the position of the optical center of the distance portion and the position of the reading portion or bifocal segment will be located correctly with respect to the eye, notwithstanding the larger size of the safety goggle. The third consideration states in part, "The effective power of a prescription, ground in standard thickness, is changed considerably when the same correction is ground with a minimum thickness of 5 mm. If the lens be of medium or high power, the change in the power of the correction may be sufficient to render it useless . . ." The thickness effect of all lenses, including prescription ground safety lenses, is computed and the proper curves are used by reliable lens manufacturers. The curves for the thicker protection lenses are obviously not the same as those for ordinary thickness ophthalmic lenses.

It is of interest that some people wear their prescription safety goggles at home, considering their greater weight and size as compared with glasses. There can be no objection, however, from an optometric point of view since the lenses of these goggles are comparable in quality, accuracy and transmission with regular ophthalmic lenses. We know of many instances in which the provision of corrective safety goggles through industry has made workers and the general public more eye conscious—a forward step toward better vision and of obvious advantage to the refractionist in general.

In speaking of the preferable use of protection goggles, worn over worker's own glasses, your article states, "Nothing is changed except the luminosity in the case of welding goggles." The use of fit-over protection goggles actually provides four lens surfaces which result in objectionable reflections before the wearer's eyes, and should be avoided when possible. In addition, goggles of this type are generally cumbersome, uncomfortable, and heavy. The protection lenses with which they are equipped are of essentially the same dimensional characteristics, thickness and weight as those required for prescription ground safety lenses which replace both with greater comfort and working efficiency on those jobs where this type of protection is suitable.

E. D. TILLYER, Sc.D.
DIRECTOR OF RESEARCH
AMERICAN OPTICAL COMPANY
SOUTHBRIDGE, MASS.

Current Comments by Carel C. Koch

A Monthly Department

in which the Editor of the AMERICAN JOURNAL OF OPTOMETRY & ARCHIVES OF THE AMERICAN ACADEMY OF OPTOMETRY will discuss items of news of general interest; such as relate to new instruments, clinical techniques, education, public health, and optometric legislative and organization problems.

CO-OPERATIVE PROFESSIONAL ACTION

For a considerable period, there has existed a need for the professions of optometry and ophthalmology to work together in close harmony. While it is true that from a refractive standpoint the two groups are competitive, this reaching at times an emulous stage; it is also true that the differences in refractive techniques which do exist between

the members of the two professions are of such minor character as to be no bar between a mutual feeling of respect or between the goal of working together on problems which may in the future prove troublesome to both.

Optometry and ophthalmology today face problems dealing with public health activities; with newer legislative programs as these affect ocular work; and with educational matters, particularly as these pertain to certain of the neurasthenical aspects upsetting visual comfort, as well as pathology, diagnosis and other inter-professional chinical accomplishments. With the immense field of ocular work, by no means well covered, every effort which brings the two professions closer should be encouraged.

It is therefore interesting and pleasant to report that in Los Angeles, representatives of the Los Angeles County Optometric Society and the Los Angeles Society of Ophthalmology and Otolaryngology met recently,[1] to take concerted action relative to problems affecting both groups. In New York City at about the same time, the officers of the Optometrical Society of the City of New York and the Advisory Committee on Ophthalmological Public Relations of the Medical Society of the County of New York were meeting[2] together, to attempt to solve other problems relevant to ocular work in the metropolis of the east. These meetings are evidences of clear thinking on the part of both groups. Thinking which bodes well for the future, in the entire field of eye care.

A TEST OF A NEW VISUAL FORM FOR MOTOR VEHICLE DIVISION IN CALIFORNIA

As usual, applicants for a motor car driver's license, who apply at the Pasadena office of the California Motor Vehicle Division, are requested to read the letters on the customary visual acuity chart. Since October 2, 1940, those applicants who failed to read the passing line, have been given a new printed form, with instructions to have this form filled out by an optometrist or physician and return same to the department before the license will be granted. The Pasadena area is being used in California as a testing ground for this new form and if it proves

[1] Reports of State Officers. The California Optometrist. Vol. 9, No. 5, p. 5. 1940.

[2] The President's Message. Bulletin of the Optometrical Society of the City of New York. Vol. 6, No. 4, p. 3. 1940.

satisfactory in this area, it will be adopted throughout the state. This new form,* besides the usual space for name, address, etc., requests the examiner to furnish the department with the following information about the eyes and vision of the applicant. (1), (A) Visual acuity, with and without glasses. (B) Correction worn or necessary for correction of ametropia. (2) Amplitude of accommodation. (3) Evidence of suppression. (4) Ocular coordination. (A) Phoria finding at 20 feet, both horizontal and vertical. (B) Fusion, and (C) stereopsis. (5) Visual fields. (6) Color vision. (7) Reactions, (A) Pupillary reflex to light. (B) Glare resistance, and (C) Glare recovery. (8) Injury or disease. The new form is of interest to optometrists because it includes the recording of refractive data rarely found in forms of this character. This is particularly true in relation to the findings having to do with the amplitude of accommodation, suppression and data on glare.

THE EFFECT OF LIGHT IN CASES OF GLAUCOMA

The optometrist Saks[1] comes to the conclusion, after an exhaustive investigation of the literature on glaucoma, as well as a number of other clinical studies[2], that the prevention and control of primary glaucoma, rests in part at least with the complete avoidance of darkness at all times on the part of the patient. Saks presents this new hypothesis and several clinical case reports[3,4] which tend to support his contentions, that the avoidance of darkness would serve as a prophylactic aid of value in the treatment regimen in glaucoma.

It was of interest to the writer therefore to find, that in discussing glaucoma back in 1928, that the ophthalmic surgeon Swanzy[5] was quoted as having said some 30 years before, that many of his glaucoma patients said their vision was much better after having visited the outpatient department of his hospital. This improvement having taken

*The California Optometrist, Vol. IX, No. 4, p. 5, 1940.

[1]Charles I. Saks. An optometric means for the control of primary glaucoma. American Journal of Optometry, Vol. 16, No. 7, pp. 241-269, 1939.

[2]Charles I. Saks. Uveitis secondary to focal infection. A Case Report. American Journal of Optometry, Vol. 16, No. 10, pp. 371-372, 1939.

[3]Charles I. Saks. A further study of increased intra-ocular pressure and its associated symptoms. American Journal of Optometry, Vol. 17, No. 2, pp. 49-58, 1940.

[4]Charles I. Saks. The remedial possibilities of light therapy in chronic congestive glaucoma. A Case Report. American Journal of Optometry, Vol. 17, No. 6, pp. 267-268, 1940.

[5]"Ophthalmic Surgeon." Ophthalmoscopy and Glaucoma. The Optician (London, England), Vol. LXXVI, No. 1966, p. 263, 1928.

place, in spite of the fact, that no special treatment had been given them. Swanzy apparently attributed their seeming improvement to come from the light used in making the individual ophthalmoscopic examinations, which were given each of these patients by the many students who were always encouraged by Swanzy to view each particular fundus of all of the patients who called at the hospital each day.

INTERPROFESSIONAL RELATIONS COMMITTEE MEETS IN NEW YORK CITY

A meeting of the Interprofessional Relations Committee of the New York State Optometric Association will be held at the Pennsylvania Hotel, New York City, April 20, 1941. Dr. Bernard Meyer. Committee Chairman, will preside. The following papers will be presented.

Dr. Frederic A. Woll, Honorary Chairman. "Statement of the Objectives and Activities of the Interprofessional Relations Committee."
Dr. Harold M. Fisher. "Aniseikonia in Routine Refraction."
Dr. Martin A. Furman. "Sinus Infections and Optic Nerve Involvement."
Dr. Arthur Sayer. "The Medical and Social Control of Venereal Disease."
Dr. Frederick W. Brock. "A New Approach to the Orthoptic Treatment of Strabismus."
Dr. Earl H. Ridgway. "Ocular Effiiciency in the Pedagogy of Chirography."
Dr. Simon L. Ruskin. "Is a New Medical College Needed in the State of New York?"
Dr. John A. Asgis. "A New Orientation in the Relationships of Dentistry, Ophthalmology and Optometry."

The meeting will start promptly at 2:00 P. M. and will continue throughout the afternoon and evening. All optometrists are invited to attend. There will be no registration fee.

NOTES ON THE IMMEDIATE ECONOMIC FUTURE OF OPTOMETRISTS

At a recent convention in New York City, Dr. M. P. McNair of Harvard University, in discussing the war economics of the United States said: (1) That price inflation can only be controlled by first, increased taxes, and second, by the national government borrowing money from citizens of low and middle income levels. (2) That the total national income of this country will continue to rise during 1941. (3) That the production and sale of consumer goods will also continue to rise during this year, but that some consumer industries will be cur-

tailed because of war production. (4) Retail business will be better in 1941 than in corresponding periods of 1940, but McNair felt that the average retailer would have to be content with a smaller markup and: (5) that those retailers who supplied the wants of wage earners and persons in the low income brackets would enjoy the most profitable businesses of all those engaged in business.

McNair was speaking to a retail association. There were no optometrists present nor were his remarks addressed to our profession. Yet much that he had to say falls with equal significance upon the professions as well as the trades. As the national income tends to rise, the volume of business done by individual members of professions or by business institutions in general, increases in proportion, and for this reason we as optometrists can look forward to several years of increased activity.

As McNair points out, however, smaller markups and increased taxes will probably keep the net income of both the business man and the professional man at a figure quite comparable to that of 1940.

Fortunately for us as optometrists, we need fear no shortage of either ophthalmic lenses or frames. Our manufacturers are equipped to assist our government in the production of optical materials necessary to the conduct of war and still give our profession the care and attention which for years has characterized the making and distribution of frames and lenses.

The optometrist, too, for the most part, is engaged in supplying the ocular needs of persons in low income levels, and will thus find himself in position to benefit most from the stimulus the war has brought to the incomes of patients within this group.

From every aspect the next several years appear to be those in which optometry will prosper and during this period much of value can be accomplished in preparing for the post-war period to come. The Academy and the A. O. A. need the active assistance of all optometrists. The programs sponsored by these societies are the result of careful planning and when carried into fulfillment will do much towards insuring the future of the profession. The years ahead will be profitable years for the individual practitioner. Let us make them also profitable for the profession as a whole, by the active support of our organizations.

ANNUAL CONGRESS OF THE AMERICAN OPTOMETRIC ASSOCIATION

The 44th Annual Congress of the American Optometric Association will be held at the Ambassador Hotel, Atlantic City, New Jersey, the week of June 29th, 1941. Delegates and optometrists who are planning to attend this important meeting, are urged to make their reservations for hotel accommodations at this time, as an exceptionally large attendance is expected.

A. O. A. EYE CONSERVATION PROGRAM

The American Optometric Association has undertaken a dual program, which has for its objective the important function of making the nation eye conscious. The A. O. A. Public Health Bureau, 535 Fifth Ave., New York City, has offered for distribution a 12 page, 5¼x5½ inch illustrated booklet entitled, "Danger, Men At Work—An Eyesight Defense Program." This interesting booklet stresses the importance of eye care among industrial workers and is adapted for use as an enclosure with a suitable letter on eye care to employers from local societies.

The Woman's Auxiliary of the A. O. A. has also undertaken a nation wide Poster Contest to stimulate eye care among students of the senior high schools of America. In both of these activities local optometric societies are urged to lend the weight of their influence to further the development of these national programs of eye conservation.

PUBLIC APATHY TOWARDS OCULAR MATTERS

As optometrists we sometimes assume that the general public is as interested in eye matters and ocular problems as are the members of our own profession. This assumption is in part true, because our chief interest lies in this direction and because also all of our professional contacts are with patients who have immediate ocular symptoms from which they seek relief.

As a matter of fact, however, there is but little real interest in ocular matters in circles lying outside those of optometry, ophthalmology and optics. This is evidenced by the statistics published recently[1] which cov-

[1] Claver, H. N. Health Information, Please. Journal of the American Medical Association. Vol. 115, No. 15, pp. 1251-1253. 1940.

ered the attendance records at the Medical and Public Health Building, at the New York World's Fair.

More than 7,500,000 persons visited this building during the fair. Of these it is estimated that 5,542,000 visited the Hall of Man and 4,947,000 visited the Hall of Medical Science. An analysis of the fifty-two exhibit units in the Hall of Man showed that the number of visitors who stopped to look at the four most popular exhibits were, in round figures, Transparent Man, 3,340,000; Embryo Panel, 2,302,000; First Year of Life, 2,161,000; Maze of Superstition, 2,115,000. Least popular were four panels representing the organs of smell, mechanics of hearing, the organs of taste and the mechanics of vision. These exhibits had only from 123,000 to 189,000 visitors apiece.

These figures portray most graphically the immensity of the job we have to do in awakening public interest in matters of visual conservation, public health optometry and the other important phases of a well rounded public relations program for optometry.

SUGGESTED FITTING STANDARDS FOR, AND POSSIBLE USE OF CONTACT LENSES

Many optometrists have been asked the question by patients and others, whether contact lenses will in time replace ordinary spectacles. The optometrist Ewalt,[1] on the basis of having extensively prescribed these aids to sub-normal vision during the past six years, feels that contact lenses will not replace regular spectacles, particularly those spectacles of low or moderate power. Ewalt is enthusiastic, however, as to the value of the contact lens, in its proper place, and points out that about 10,000 patients in the United States have been fitted with these aids to sub-normal vision.

He also suggests that optometrists set up an attainment standard for successful and comfortable fitting of contact lenses. His suggestion is, that any patient who, after the usual test and trial periods, can wear the contact lens for at least five hours on three consecutive days be considered normally fitted, and that the particular appliance prescribed,

[1] H. Ward Ewalt, Jr. Problems of Contact Lenses. O-Eye-O. Ohio State University, Chapter of Epsilon Psi Epsilon. Columbus, Ohio. Vol. X, No. 1, pp. 1 and 3. 1940.

has a proper set of inner contour curves, to rest comfortably on the anterior surface of the eye for which it is intended. Here is a problem of fitting standards which could properly be referred to the Committee on Sub-Normal Vision of the Academy.

SCHOLASTIC LEADERSHIP

Optometrists have been fortunate in the academic leadership which for years has guided optometrical courses in certain schools of higher learning. Under the able direction of these scholastic heads, universities teaching optometry have developed curricula which have set a high standard in refractive education.

This fine progress over the past several decades, has been made possible, in great part, by the interest taken in optometrical education by men not themselves optometrists. Men who by profession were scientists and educators, and who because of their sincere interest in improving the educational opportunities of the undergraduate optometrist have done much of the preliminary work necessary in developing this phase of a growing profession.

The debt we owe to these foremost educators we can never wholly repay, as these men have devoted many useful years of their academic lives to serve a profession to which they were lending their administrative and teaching ability. Theirs was a splendid service and one which will ever remain in the history of optometry as one of outstanding sacrifice, inspiring development and purposeful building.

Yet it is illogical to expect optometry to continue to draw upon outside technical academic assistance to staff its educational centers. Our profession has advanced today to that point wherein a sufficient number of graduate optometrists, with additional higher academic qualifications, are now becoming available to enter the teaching ranks as instructors, professors, department heads and even administrative officers as vacancies occur in these posts.

In no way is this said to disparage the excellent work done in this field by those educators who have come into optometry from other fields. These men are all still needed and the fine work already done by them will ever live to their credit. Yet the fact remains that as a profession, optometry, if it is to continue to gain academic recognition, must

supply from within its own ranks, some at least, of the future leadership in this highly important teaching field.

A decade ago this would have been difficult. Today the situation has changed, as optometrists with suitable graduate training, degrees and experience are available to fill these specialized educational positions.

At this time we express our gratitude to the leaders of these university schools and courses for the splendid manner in which they have carried forward their work in the past. And because of the good job which has been done we can look forward with some assurance to a continuation of this work by them, and also the more recently trained optometrical educators, upon whose shoulders will fall the future responsibility of carrying on these fine professional training programs.

DIFFICULTIES ENCOUNTERED IN HEALTH SERVICE PROGRAMS

From time to time the suggestion is made that optometry as an organized group, promote or join with other professional practitioners in assisting in the development of various state-wide health-care programs of both private and public nature. In fact, we find in some quarters, a decided trend towards this type of thinking among certain optometrists, who now seem to feel that the future development of optometry lies along the paths of state-wide socialized health service for the indigent and of low cost group insurance for patients of the medium and lower income levels.

While these suggestions have been made in optometric circles, as yet our profession has taken no position relative to optometric participation in these schemes, and it is well that this is so.

In the first place, it is too early to come to the conclusion that private practice in the healing arts is a thing of the past and is something which is surely doomed to rapid extinction. The public as a whole is still to be heard from on this point and the writer is quite sure that the health regimentation of large blocks of American citizens will meet with little favor. And regimentation of the patient is the inevitable result of either of the proposed plans.

Then too, where these plans have already been placed in effect, there is no unanimous opinion as to their success. In fact, it is evident that both the public and the professional practitioners involved still

find these utopian panaceas something short of the desired and hoped for goal. The great state of Wisconsin, for instance, has been experimenting for some time in these fields and evidently finds herself in some difficulties, as the following excerpt will indicate. This was taken from an editorial published in the MILWAUKEE JOURNAL.

> "The good doctors in the State Medical Society of Wisconsin are rapidly making a wreck of their efforts to promote the spread of medical care through prepaid hospitalization and sickness insurance.
>
> "Their latest monkey wrench is the action of the society's house of delegates, at its Milwaukee meeting two weeks ago, demanding that doctors divorce themselves from participation in the affairs of Associated Hospital Service, the organization created under state law to operate and maintain a prepaid hospital plan.
>
> "This direction to the doctors to withdraw from the offices and committees of the hospitalization service was made behind closed doors and was meant to be kept 'confidentially' within the profession. The general public was not to be let in on it. Why? Evidently because it was to be used as a lever in certain controversies organized medicine has with Associated Hospitals. Also, maybe the doctors realized that it might not look well for them to be caught pulling the rug out from under a service that they professed to be much interested in and helped to start.
>
> "The main controversy between the doctors and the hospitals revolves around the inclusion of X-ray and other technical services in the benefits the subscriber to the Associated Hospital Service gets. The doctors say that the Associated Hospital Service organization is practicing medicine under the form that is used.
>
> "The Wisconsin Radiological society opposed this from the first. It was against inclusion of the technical services unless a different plan of payment was set up. The state society is now actively supporting the radiologists.
>
> "This would appear to the layman to be a hairsplitting proposition. He is interested in getting his hospitalization covered as widely as possible. To him it makes little difference what route the pay takes. . . . .
>
> "So what is the matter with the State Medical Society of Wisconsin? Does the trouble lie in professional politics, or in layman administration in the office of the state society, or where is it? Something is wrong.
>
> "The state society in a sense is on trial. It offered to promote voluntary plans in order to head off a demand for state medicine. It would seem that the main interest of the society should now lie in trying, in good faith, and with a broad outlook, to make these plans work."

The foregoing excerpt indicates several things to us as optometrists. These are, (1) that when a scheme of this character is started it is apt to branch out into fields far from those originally proposed. (2) That professional opinion, even on matters of health, gets but scanty attention from the general public, and (3) that once connected with an activity of this kind, the professional man is held responsible for its success irrespective of the workability of the plan or its effect upon the professions involved.

Physicians in Wisconsin are now faced with the difficult task of

carrying forward a program of health service and at the same time safeguarding their professional freedom and their integrity as private practitioners of medicine. The optometric profession has to date, refrained from taking a position with reference to these schemes and it is to be hoped that no premature action will be forthcoming until these important matters can be given much additional study.

FUTURE ISSUES

The following list of original material on ocular and refractive subjects are but a few of the many splendid papers which will be presented to the profession during 1941 in the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

Bannon, R. E. The Technique of Measuring and Correcting Aniseikonia.

Hall, R. M. Studies in the Control of Amblyopia.

Smith, W. Orthoptic Case Report.

Ellerbrock, V., and Fry, Glenn A. Accuracy in Determining the Reading Depth.

Luckiesk, M., and Moss, F. K. A New Method of Subjective Refraction at the Near-Point.

Baxter, R. C. The Effect of Peripheral Stimuli Upon the Positive Fusional Reserve.

Jaques, L. Astigmatism.

Fry, Glenn A. The Skiascopic Determination of the Limits of Relative Accommodation.

Shurin, A. H. An Investigation of Interpupillary Measurements.

Blaess, M. J. Dinitrophenol and Its Effect Upon the Refraction and Transparency of the Crystalline Lens.

Neumueller, J. Proximal Convergence and Accommodation.

Fry, Glenn A. An Analysis of the Relationships Between Phoria, Blur, Break and Recovery Findings at the Near-Point.

Doane, H. C. An Analysis of Clinical Data on Aniseikonia with Case Reports.

Parkins, G. A. Controlled Research Versus Clinical Findings.

Wheelock, A. P. Cataract and Against-the-Rule Astigmatism.

Feinbloom, W. A Teloptic Magnifier Aid for Incomplete Optic Nerve Atrophy.

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CLASS II.—Open to any optometrist who has been in practice more than five years but less than fifteen, and who is now practicing in an ethical and professional manner* and upon acceptance by the Board of Examiners of five case reports from his own files concisely and completely annotated as outlined in the Manual of Instruction, and who has taken and successfully passed a practical examination. It is to be understood that the examination given by the Board is in no way comparable to individual State Board Examinations, but is in the true sense, a screening process by which the Board of Examiners will be able to determine the ability of the candidate to successfully handle the practical problems met in general routine practice.

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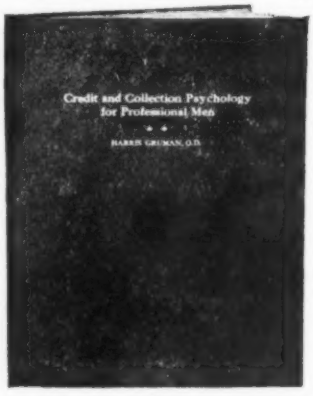

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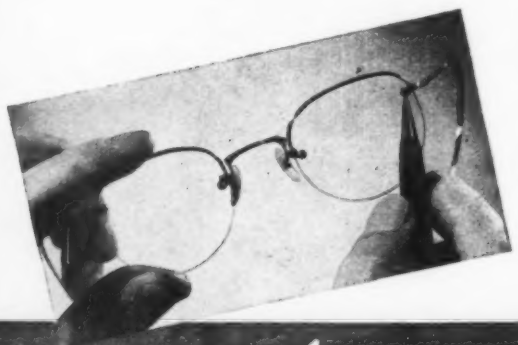

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